River Restoration – Aligning DNR River Programs

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Iowa Department of Natural Resources

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Introduction

In 2013, the Iowa Legislative Council authorized the creation of *The Iowa Rivers and Waterways Study Committee*. The Committee was directed to consult with interested parties in considering options for restoring Iowa's rivers and water ways. The Committee was also charged to develop recommendations for an initial plan to prioritize restoration projects, and provide defined goals and measurable improvements.

The Committee produced the following recommendations:

- That the Department of Natural Resources and the Department of Agriculture and Land Stewardship, in collaboration with other involved entities, develop a plan that builds upon current and emergent efforts and related programs to identify and facilitate meaningful and effective river restoration priorities.

- That the Department of Natural Resources and the Department of Agriculture and Land Stewardship continue to initiate and cooperate in demonstration projects with local landowners and watershed groups to provide examples of options and outcomes that could address a range of restoration needs and opportunities.

In response to these recommendations, DNR held a four-day "value stream mapping (VSM) event in early 2015. The VSM was designed to explore the roles and priorities of DNR's river-related programs, and to identify opportunities to improve collaboration, create efficiencies and develop new efforts for river restoration. This involved staff from the numerous programs areas within DNR that relate to rivers and streams, and included representatives from the Department of Agriculture and Land Stewardship (IDALS), the Natural Resources Conservation Service (NRCS), County Conservation Boards, and the Iowa Natural Heritage Foundation (INHF).

DNR program areas involved in the VSM

Permitting:

Dam Safety - Inspection
Dam Safety - Construction
Flood Plain Management
Sovereign Lands Construction
Environmental Review

Education:

Project AWARE
SWIM Workshop
Restoration Review and Assistance
River / Paddling Safety Education
River of Words

Recreation:

Fisheries
Wildlife
Water Trails
Protected Waters Areas
Dam Mitigation

Monitoring:

Use Attainability Analysis
Integrated Report (303d/305b)
Water Monitoring
Steam Flow Gauging
IOWATER
Watershed Improvement

In addition to addressing legislative recommendations, DNR has begun working on a plan to create a stream mitigation program that aligns with the requirements of the joint US Army Corps of Engineers (Corps) and US Environmental Protection Agency's (EPA) Compensatory Mitigation Rule passed in 2008. Mitigation is required when road improvement projects and other construction activities are unable to avoid impacts to rivers and wetlands. To meet federal guidelines, improve the quality of proposed stream mitigation projects, and increase the consistency and speed of project reviews, the DNR is working with partners to draft an "Iowa Stream Mitigation Method" that can be used statewide to evaluate impacts from projects as well as proposed mitigation on Iowa's streams. Once finalized and approved by the Corps, this Method will provide a platform for development of stream mitigation banks or in-lieu of fee programs. Such programs benefit rivers, developers, government agencies and the public by consolidating resources to produce high quality restoration projects in a timely manner.

Many elements of the DNR river restoration strategy outlined in this document will be important for successful creation of a stream mitigation program. Although stream mitigation may become a source of funding for some restoration projects, areas of the state with the greatest restoration needs may not be the same areas with the most mitigation needs.

This strategy document describes the value of and challenges to river restoration in Iowa; the role of various DNR programs related to restoration efforts; and current and future actions by DNR, in conjunction with its conservation partners and landowners, to better direct program efforts towards beneficial and sustainable river restoration for Iowans.

Why River Restoration

Rivers and streams, their channels and valleys, are a defining feature of Iowa's landscape. They have formed and evolved over thousands of years, in response to the climate, soils, and geologic setting of their watersheds. Human modifications to the landscape, and to the rivers themselves, have altered waterways across the world; Iowa is no exception. Through time this alteration has affected water flows, in-stream and near-stream habitat, sediment transport (erosion and deposition), and water quality. River restoration attempts to overcome the effects of these alterations and improve the function and value of our waterways for, recreation and boater safety, wildlife and fisheries habitat, flood mitigation, quality of life, water quality and associated economic benefits.

The benefits of river restoration are many, a fact that presents a challenge to holistic restoration efforts: river restoration means different things to different people. Some envision streams that are re-meandered after being straightened, removal of dams, stabilized river banks and waterways connected to their floodplains. Others think of water running with little sediment, healthy channel habitat, and productive fisheries. Restoration brings watershed protection to some minds, and a range of recreational opportunities – hunting, fishing, paddling, hiking, public access – to others. The numerous river-related programs and interests within DNR, partner agencies, landowners, and the public reflect the range and viewpoints on river restoration. The variety of interests is a plus that adds support; aligning them to accomplish restoration is the challenge.

The guiding principles behind this River Restoration Strategy include:

- **Evaluate:** The rivers program must evaluate a broad range of information relating rivers to human health and safety, biological diversity, and economic vitality.
- **Protect:** The protection of life and property, as well as the ecological/hydrological functions of Iowa's river corridors in a sustainable way is critical to the viability of this resource, landscape, the health, safety and enjoyment of future generations.
- **Enhance:** Opportunities exist to enhance the functionality and overall quality of Iowa's rivers and streams.
- **Connect:** A comprehensive river programs requires the connection of people to rivers, coordination of programs and sharing of information.

This strategy focuses on necessary improvements within DNR's river programs and coordination with external partners to help move restoration efforts forward. Our vision is to:

Evaluate, Protect, Enhance, and Connect river functions for Iowans.

The aim of this approach is to maximize the long term value, function, and health of rivers and streams through focused communication and collaboration with a broad range of partners. It necessitates coordinating watershed improvement, recreation, permitting, education, and evaluation programs with all partners. Under the framework outlined in this strategy, steps will be taken to develop a consistent approach to restoration efforts across agencies for assessing causes of problems, identifying best management practices, and ensuring successful outcomes for stream stabilization, dam removal and modification, habitat improvements, flood plain connectivity, riparian management, and watershed work.

Iowa River Programs

A significant number of DNR program efforts relate to rivers, river corridors, watersheds, and water quality. These programs have specific missions and funding streams that DNR will align to promote and support river restoration. River programs and their general mission and scope are summarized below.

Water Quality Monitoring

Iowa's Water Monitoring program provides consistent, unbiased information about the condition of Iowa's surface and groundwater resources so that decisions regarding the development, management, and protection of these resources may be improved. With respect to streams and rivers, the program conducts scheduled chemical and biological monitoring, and conducts annual assessments of contaminants in fish tissue. Monitoring information and analysis provides much of the basic information used by other river programs.

The monitoring program also contracts with the U.S. Geological Survey (USGS) for stream-flow gauge stations. Flow data are needed for flood and drought evaluation, for describing conditions for water-based recreation, and for calculating loads of chemicals or sediment transported by our rivers. Water quality and flows are critical information for restoration activities because projects that do not take river dynamics into account are likely to be under- or over-designed, ultimately leading to failure or a waste of resources.

Use AttainabilityAnalysis

All Iowa streams carry a designated beneficial use of fishable and swimmable unless shown otherwise through a scientifically based assessment, termed a Use Attainability Assessment (UAA). DNR conducts this field work to determine whether a "fishable and swimmable" presumption is appropriate for these waters. Once a field assessment is complete, the DNR will

draft the UAA reports which provide an analysis of attainable uses for each specific waterbody. These UAAs are available for public review, and any recommended use designation change proceeds through the formal rulemaking process.

Integrated Water Quality Report and the Impaired Waters List

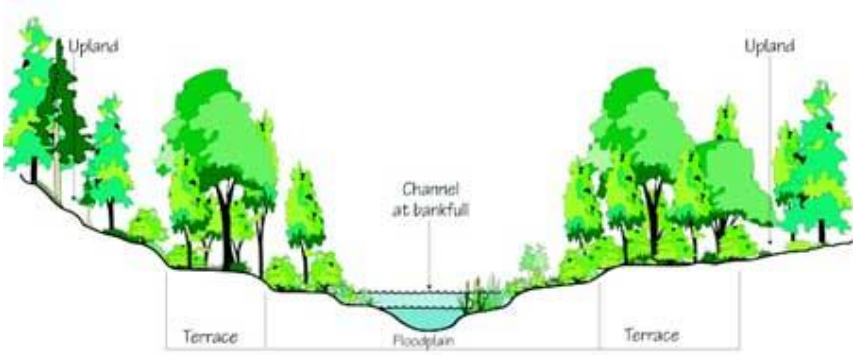
Every two years, all available data on water quality, biological integrity, and fish contaminants for the state's rivers, streams, lakes and wetlands are summarized and compared to the State's water quality standards. Violations of water quality standards indicate that a water body is not fully supporting its designated beneficial uses. Waters identified as not fully meeting water quality standards are added to the state's list of impaired waters as required by Section 303(d) of the Clean Water Act. This list is made available for internal and external review prior to submittal to the EPA for approval. TMDL's will be developed by DNR- Watershed Improvement Section for waters on this list. The list and summaries of the degree to which all assessed waters support their water quality standards are submitted to EPA as the Integrated Report.

Watershed Improvement Section

The Watershed Improvement Section (WIS) supplies the "watershed" aspect of river restoration. WIS is responsible for the development of Total Maximum Daily Load (TMDL) documents for all waters on the state's list of impaired waters. Assessments include land use, stream banks, gullies, and livestock and urban impacts. The assessments are used for extensive modeling analysis as part of the TMDL development. WIS partners with IDALS Division of Soil Conservation and Water Quality (DSCWQ), NRCS, Soil and Water Conservation Districts (SWCDs), Iowa State University – Extension and others, operates under Iowa's federally required Nonpoint Source Management Plan developed with extensive partner and stakeholder input. WIS also promotes the development of Watershed Management Authorities and their subsequent watershed-scale planning efforts to improve water quality and mitigate flooding in rivers and streams. WIS also provides assistance to local watershed groups to conduct watershed assessments through the use of GIS technology. With this assistance, local groups developing watershed management plans and implementation projects can focus efforts to areas and practices allowing for maximum water quality benefits. WIS makes funds available to these groups through Watershed Implementation Grants, which provide EPA Clean Water Act Section 319 funding and technical assistance to local watershed groups to implement 9-element Watershed Management Plans (WMPs) through a local watershed project. These plans and projects are required to focus on addressing Iowa's list of impaired waters in accordance with Section 303(d) of the Clean Water Act. Projects typically provide cost-share funding to landowners of up to 75% in high priority areas for the installation of practices that reduce the amounts of pollutants reaching the lake, creek, or river segment. Short-term projects may last from 3 to 5 years in duration, whereas longer term projects may require multiple project phases to achieve water quality goals.

Low-head Dam Mitigation

Low-head dams are interruptions in a natural river course. They alter stream hydrology and sediment transport, create safety hazards and block fish passage. Mitigation projects can reduce or eliminate hazards, and restore fish passage and the public's ability to navigate further upstream and downstream. DNR has developed a plan for dam mitigation and identified priority dam. To implement the plan, DNR's dam mitigation team seeks input from communities, non-governmental organizations (NGO's), and other interested parties, and assists these partners to develop projects that best fit their needs. DNR also provides technical assistance and funding, and helps troubleshoot problems during construction. Communities around Iowa have embraced the idea that replacing high-



Riparian Ecosystem Cross Section
Steep to Gentle Terrain

maintenance and failing dams with lower-cost, safer alternatives can also be great for the river and fishing while better serving recreational needs of today's Iowans.

Dam Safety - Construction and Inspection

DNR evaluates and issues approval of dam construction or removal, changes in operation, structural modification, or raising or lowering of normal impoundment levels. This process includes pre-application collaboration, submittal of applications, review of applications, correspondence with the applicants, determination of affected landowners, and collaboration with environmental experts. River restoration involving changes to existing dams must follow these procedures.

DNR also has the authority and requirement to perform periodic inspections of dams to ensure the safety of human life and property. Inspections provide the basis for dam inventories, evaluation of downstream hazards and hazard potential classification, correlation of approved construction plans with actual construction, safety evaluation of existing dams, and emergency response planning and execution. As dams are inspected, the appropriate compliance and enforcement activities may be initiated to ensure that all deficiencies are addressed.

Sovereign Lands

"Sovereign Lands" are lands and waters administered by DNR, and include Meandered Sovereign Lakes, Meandered Sovereign Rivers, State Forests, Wildlife Management Areas, State Parks, and State Preserves. River restoration efforts may be planned for Sovereign Lands. Any construction on, above, or under these state-owned lands or waters must secure a sovereign lands construction permit from the DNR. A joint application form must be completed and sent to the DNR Sovereign Lands and Flood Plains programs, as well as the Corps.

Corps Section 404 Permit / DNR Section 401 Water Quality Certification

Section 404 of the Clean Water Act authorizes the Secretary of the Army, acting through the Corps of Engineers, to regulate the discharge of dredged or fill material into waters of the United States. Persons planning any type of work involving the discharge of dredged or fill material into "waters of the United States" are requested to submit an application for a Section 404 permit to the Corps. Upon receipt of an application, a determination of the Section 404 requirements is made and the party notified of the actions necessary for compliance with Section 404 of the Clean Water Act.The federal Clean Water Act gives authority to each state to issue a 401 Water Quality Certification for any project that needs a Corps 404 Permit. The 401 Certification is a verification by the state that the project will not violate water quality standards. DNR works with applicants to avoid and minimize impacts to water.

Flood Plain Management

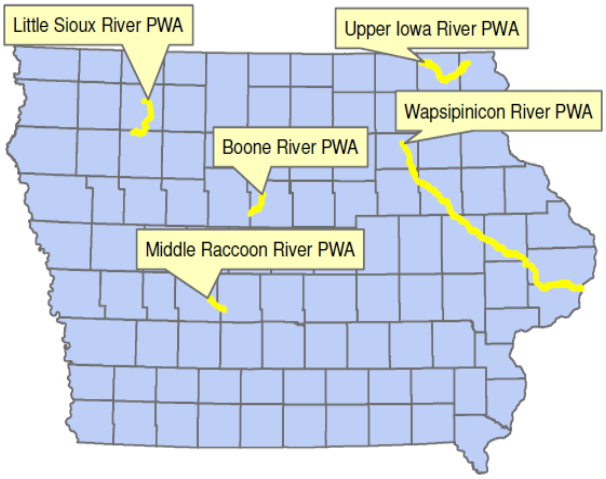
Many societal activities occur on flood plains and floodways, including many river restoration efforts. DNR regulates construction on all flood plains and floodways in the state to protect life and property; and to promote the orderly development and wise use of Iowa's flood plains. Any person who desires to construct or maintain a structure, dam, obstruction, deposit or excavation, or allow the same in any flood plain or floodway must contact DNR prior to the beginning of any work. The DNR will help determine if the proposed project needs an approved flood plain development permit. The process includes review of permit applications, correspondence with the applicants, other affected landowners, collaboration with environmental experts and issuance or denial of construction permits.

DNR works with communities and counties to develop and administer local floodplain management programs, coordinates the National Flood Insurance Program, and assists the Federal Emergency Management Agency and Iowa Homeland Security and Emergency Management Division in responding to flood disasters. In addition, DNR has partnered with the Iowa Flood Center at the University of Iowa and seven nationally recognized floodplain mapping firms, to develop flood hazard studies throughout the State.

Environmental Review

In response to requests for Environmental Review for natural resources, DNR will search records for state-and federally-listed endangered or threatened species, rare natural communities, sensitive habitat, and state lands and waters in a proposed project area. A complete request for review includes: a narrative which describes the proposed project, current land use details, legal description and additional information such as a preliminary plan. The letter of review does not constitute a permit, and permits may be required from DNR or other state or federal agencies in advance of work.

Protected Water Areas



Protected water areas (PWAs) program supports the preservation and enhancement of water resources with exceptional cultural and natural value. In the early 1980's five river segments were selected as PWA's along the Boone, Little Sioux, Middle Raccoon, Wapsipinicon and Upper Iowa rivers. These are some of Iowa's most scenic natural areas. Under Iowa's Resource Enhancement and Protection (REAP) program in the early 1990s, the PWA program was funded for voluntary land protections, including conservation easements and willing sellers. Today, streambank restoration services are also available to interested landowners.

Wildlife

The wildlife program works with partners to restore and actively manage wetlands, grasslands, and forests on both public and private lands along portions of Iowa's rivers. The riparian corridors associated with these rivers support a high diversity of wildlife species and are important to sustaining healthy populations of a number of game and non-game wildlife. In addition, the wildlife bureau provides and manages public access to rivers and adjacent restored habitats on public land for fishing and hunting, boating and paddling, nature observation, hiking, outdoor education, and other compatible recreational uses. Many of the largest publicly owned corridor projects along Iowa's rivers are the result of multi-agency flood recovery projects aimed at providing the most severely affected landowners with additional alternatives for shifting their farming operations to less flood-prone areas. To that end, the wildlife bureau's public and private land biologists continue to work through this multi-agency partnership to provide conservation opportunities for landowners in these areas who are dealing with chronic flood damages to their properties. A healthy riparian corridor along rivers is important in supporting the aquatic habitats necessary for healthy fish and other aquatic life communities and enhances the experience of boaters and paddlers on the river. These areas support additional terrestrial recreational opportunities for Iowans to enjoy the diverse wildlife and habitats associated with rivers which enhance the experience for paddlers, hikers, anglers and hunters alike.

Fisheries

As managers of public fishing waters, DNR Fisheries strives to provide the best fishing possible using a combination of good water quality, balanced fish populations and adequate angler access. Stream habitat is recognized as a key factor influencing the health of stream fish populations. Iowa's river and stream fish resources are dependent upon the quality and quantity of aquatic habitat, much of which has been greatly degraded. Therefore we work with public and private land managers to enhance, improve, or restore stream and river resources. The focus of this work is generally improved fishery resources, but may include other aquatic organisms and aquatic habitat in general.

Successful stream and river habitat projects commonly benefit from diverse partnerships that focus a broad array of talents and expertise towards the goal of improving aquatic habitat, and in many cases the role of DNR Fisheries is to foster or contribute to the appropriate partnership. DNR Fisheries further

promotes recreational use of Iowa rivers and streams through production and stocking of recreationally-important fish species including brook trout, brown trout, rainbow trout, and walleye.

Water Trails

Water Trails are recreational corridors and routes on rivers and lakes that provide a unique experience for all water users. Water trails help re-connect Iowans to their waterways' history, heritage, geology, fisheries, and wildlife. Water trails provide river access and can include amenities like riverside camping, wild spaces, picnic areas, restrooms, and watercraft rentals provided by local, state, and federal partners. Coordinated signage and mapping systems guide users toward the types of experiences they seek, ranging from a highly social first-time river experience lasting a few hours to multi-day adventures. Water trail partners at the local level are enabled to steward their waterways, which boosts local economies and give Iowans outdoor experiences just out their back doors. Iowa DNR water trails staff lead through setting standards for planning requirements, providing funding and technical assistance, and maintaining the framework of the overall system.

River / Paddling Safety Education

Safety on or near rivers is paramount. DNR provides comprehensive river safety education aimed at reducing fatalities at common hazards such as low-head dams, woody snags, and temporary obstructions. Dams in particular are a hazard; over the last several decades, Iowa has averaged about two dam-related fatalities each year.

In addition to offering river safety education, DNR also works to "train the trainers" with two-day canoe and kayak courses. This training allows local partners such as naturalists, park staff, and educators to offer high quality instruction and programs themselves at the local level.

Restoration Review & Assistance

There are many parties interested in river restoration. DNR staff responds to requests from engineers, governmental and NGO partners, and sometimes local landowners about stream stability and riparian issues. Those seeking advice or review by staff are looking for a wide range of assistance including understanding and assessing river dynamics, determining how best to improve fisheries and recreational opportunities, identifying options for project design and engineering, and finding project materials and funding. DNR works with external partners, such as

NRCS and the Hungry Canyons Alliance, to provide this assistance, for which there is a growing demand that is beyond the limited available staff resources.

Stream and Watershed Integrated Management (SWIM) workshop

The Stream and Watershed Integrated Management (SWIM) workshop is designed to train individuals who work with stream and watershed principles and practices. It includes presentations by watershed and stream management professionals from Iowa State University, University of Iowa, DNR, IDALS-DSCWQ, and NRCS. Typical attendees are those likely to be involved in river restoration, and commonly are affiliated with DNR, IDALS-DSCWQ, County Conservation Boards, SWCD's and other watershed interests.

River of Words (ROW) Environmental Art and Poetry Competition

River of Words (ROW) is an environmental poetry and art contest for youth aged 5 to 19 in grades K-12 held every year. ROW is a Project of The Center for Environmental Literacy at St. Mary's College of California. The contest is designed to help youth explore the natural and cultural history of their own watershed, and to express what they discover through poetry and art. Winners of the international contest are announced in April of each year, and are honored in a mid-April ceremony at Saint Mary's. Iowa's ROW competition is based on the international ROW competition for grade school through high school students. Entries from Iowa are returned from the National ROW to the DNR where local art and poetry teachers serve as judges. State winners are invited to a ceremony and are awarded certificates.

Project AWARE

Project AWARE - A Watershed Awareness River Expedition - is Iowa DNR's volunteer river cleanup which focuses on a different river and watershed each year. Project AWARE's purpose is to increase awareness about, and community involvement in, water quality issues that impact the health of Iowa's water resources; engage Iowa's citizen volunteers in a project that challenges them to become stewards of the river and that produces a tangible, quantitative result; and demonstrate the commitment of Iowa's citizens by giving of themselves and their valuable time to make a difference. AWARE also serves to engage landowners along the river in conservation and protection actions. Volunteers have the opportunity to participate in educational programs, collect and analyze water quality data, and become advocates and participants in river restoration.

IOWATER

IOWATER is Iowa's citizen volunteer water monitoring program coordinated by the DNR. Its mission is to "protect and improve Iowa's water quality by raising citizen awareness about Iowa's watersheds, supporting and encouraging the growth and networking of Iowa's volunteer water monitoring communities, and promoting water monitoring activities as a means of assessing and understanding Iowa's aquatic resources." IOWATER trains citizens to conduct basic water chemical, physical, and biological measurements. Once trained, volunteers are provided with monitoring equipment to begin testing and provided access to an online database to submit data. These educated and connected citizens are important partners in river restoration.

Transforming and Aligning DNR's River Restoration Efforts

The River Restoration VSM event developed a Transformation Plan to guide DNR's river-related programs into an improved state of communication, cooperation, and coordination. Priority issues were identified and teams assigned to create plans to address them. Priorities were grouped into four main themes:

Evaluate:

- Developing a Comprehensive Website for Water Quality and River Data
- Creating More and Better Data Interpretation Products
- Inventorying and Improving River-Related Human Health Alerts

Protect:

- Increasing Collaboration of Fisheries, Wildlife, and Water Trails Programs on Conservation Plans and Overlapping Priorities
- Developing and Implementing a River Conservation Areas program.
- Developing a Stream Mitigation Program for Iowa

Enhance:

- Adding Hydrologic – River Modeling Capabilities to DNR Staff Expertise
- Coordinating with Floodplains Program during Restoration Project Planning
- Developing a Best-Practices Toolbox for River Restoration

Connect:

- Coordinating Education, Interpretation, and Communication Approaches
- Connecting DNR River Programs to Restoration Effort

The priorities and plans for evaluating, protecting, enhancing, and connecting DNR's river programs are summarized below.

Evaluate:

Priority: Develop a Comprehensive Website for Water Quality and River Data

The Issue:

DNR and its partners generate a considerable amount of measurements of water quality and other river-related data that is critical for restoration efforts. Past DNR data management and distribution efforts have seen mixed success. Positive results include well managed, up-to-date databases that are easily queried for reporting and spatial analyses. However, high levels of database complexity and barriers to access for users remain a challenge. . A successful River Restoration program requires a comprehensive collection of readily useable information, consolidated into a single accessible website.

DNR will develop a practical approach to address the data consolidation and access needs identified during the VSM event. "Data Discovery", the ability for data users to learn what exists, is a key part of this, which requires an inventory of available DNR data that are readily amenable for public access. Following this inventory would be the creation of a new page on the DNR webpage with links to the inventoried water related data. The data could be as simple as a spreadsheet or as complex as a relational database. Each link would have one or more keywords or "tags" that would allow the public to identify specific link(s) as a response to a search query.

DNR is beginning to implement an application called the *Comprehensive Knowledge Archive Network* (CKAN – http://ckan.org). CKAN is an open-source data portal platform designed to easily share data. DNR will inventory pertinent DNR river-related data, whether in spreadsheets, databases or web applications for use with CKAN. DNR sees CKAN providing a standardized, consistent and pre-established framework for searching and accessing data important for a river restoration program.

The scope of information needed for river restoration activities makes comprehensive data management and distribution to users a challenge. CKAN will provide an important first step. The current state of the "data industry" makes other, potentially more powerful, approaches both daunting and expensive. However as data handling applications continue to evolve, DNR will track these developments with an eye toward future improvements.

Recommendations:

- Conduct an inventory of data sources.
- Conduct and inventory of DNR and partner data needs.
- Implement CKAN with the appropriate data sources to allow public discovery and access.
- Maintain an ongoing tracking of data industry developments that may improve our data delivery.

Priority: Create More and Better Data Interpretation Products

The Issue:

Through a variety of monitoring and assessments efforts, DNR and its partners collect and analyze a significant amount of river-related data, and develops a number of interpretation products from this data. There is a need to inventory and coordinate current data tools, their data needs and update schedules, and their distribution method. In addition to current efforts, what additional tools are needed? Are they most logically done by DNR or others? Are there opportunities to automate updates to interpretation products, whether existing or new?

Currently we have identified these existing DNR data tools:

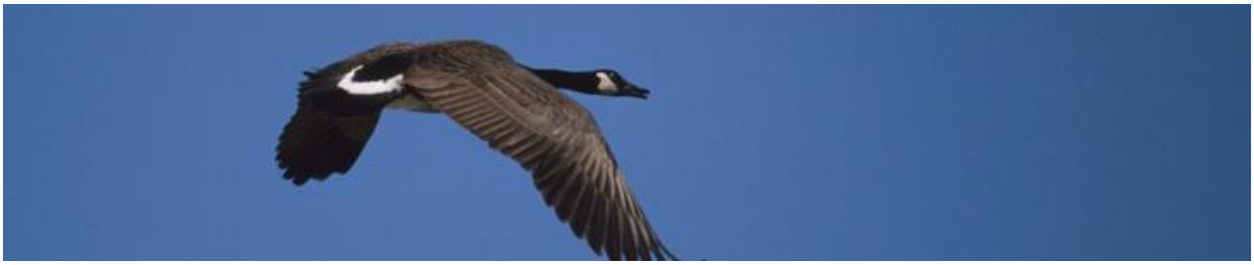
- DNR Rapid Watershed Assessment mini reports. https://programs.iowadnr.gov/iowawaterweb/rwa/)
- DNR fisheries lake data (http://www.iowadnr.gov/idnr/Fishing/WheretoFish/LakesPondsReservoirs.aspx)
- DNR Bionet – Database to store, analyze and report fish and benthic macroinvertebrate data (https://programs.iowadnr.gov/bionet/)
- Water Monitoring Atlas (http://programs.iowadnr.gov/maps/watermonitoring/
- Water Quality Index (http://www.iowadnr.gov/Environment/WaterQuality/WaterMonitoring/WQI.aspx)

DNR Partners are providing these data products:

- NRCS Rapid Watershed Assessments http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ia/technical/cp/?cid=nrcs142p2_008192)
- Iowa Flood Information System (http://ifis.iowafloodcenter.org/ifis/en/)
- USGS Stream Gauges – stream flow http://waterdata.usgs.gov/ia/nwis/current/?type=flow
- USGS Streamflow Estimation tool (BETA) – http://wim.usgs.gov/Iowa/StreamEstMapper.html

Staff have identified several excellent web-based interpretation sites that might be useful templates. Two examples are:

- California Water Quality Web Portal (http://www.mywaterquality.ca.gov/)
- Great Lakes to Gulf Virtual Observatory (http://gltg.ncsa.illinois.edu/geodashboard/)



Recommendations:

- Complete the inventory of existing data interpretation tools.
- Current links for existing data interpretation tools are buried – provide clearinghouse of tools available, both internal to DNR and external.
- Survey customers and partners as to what types of data they need and at what scale.
- Evaluate how data and tools are currently organized; much is housed by is by program. Is there a need to organize by topic, similar to California's Water Quality Web Portal?

Priority: Inventory and Improve River–Related Human Health Alerts

The Issue:

DNR issues advisories, guidance, or notice of a variety of conditions that may affect the health of people recreating on or in Iowa Rivers. There is a need to coordinate current efforts, assess if others are needed, evaluate how information is communicated to the public, and recommend any changes to improve protection of public health.

Currently most water recreation advisories issued by DNR are related to state park beaches. These advisories are based on monitoring for *E. coli* bacteria and aquatic algal toxins such as blue green algae or microcystins. Advisories and notice for river related health issues include fish consumption advisories, and signage alerting river uses of low-head dams. DNR also puts out

press releases for any release of contaminants to a water of the state. Wastewater bypasses and spills of chemicals and manure are typical examples. However these press releases don't always indicate whether human health concerns are posed by spills or what public precautions can be taken. DNR and partners also supply signage warning of river users of low head dams.

Recommendations:

- Develop a consistent approach for health-related advisories, connecting the relevant river program and DNR communications staff.
- Include human health concerns and aquatic life impacts in news alerts.
- Develop ways to alert water recreators to reaches of streams impacted by spills or releases. Explore coordinating this information output with other stream data used by river users such as stream-flow rates. Consider mobile phone applications.
- Assess our ability to define locations or conditions with frequent water impacts, such as wet-weather wastewater bypasses.

Protect:

Priority: Increase collaboration between Fisheries, Wildlife, and Water Trails programs for conservation planning and identification of priorities.

The Issue:

Three DNR programs - Fisheries, Wildlife and Water Trails - work extensively on rivers and streams, their riparian corridors and watersheds to protect and enhance river and stream resources and to improve, enhance and expand quality fishing, hunting and recreational use of these areas. Although communication and collaboration among these programs occurs whenever possible, a dedicated planning effort to combine all three program's conservation plans and work priorities on rivers would improve cooperation between programs, improve the use of limited funds for these tasks and help achieve holistic river restoration for all users.

Public use of rivers and streams in Iowa is growing and important to the citizens of Iowa. Anglers are the dominant existing user group for Iowa's rivers according to a 2010 survey by Iowa State University. A 2007 survey of Iowa anglers revealed that 40% of Iowa anglers prefer to fish rivers and streams over lakes. The 2010 survey on the recreational use of Iowa's Rivers also reported that the overall economic impact from recreation supported over 6,350 jobs with $824 million in sales and $130 million of personal income.

Combined planning ensures that protection, enhancement, and recreational improvements that occur on Iowa's rivers and streams are well thought out, well-constructed and maintained, provide easy and sufficient access, and are relevant to the current demands and within the limitations of the resource. Combined planning eliminates redundancy, develops consistent messaging, and helps foster partnerships for improved resource management. While all of the programs have specific missions and goals, coordinated approaches will add greatly to river restoration efforts.

Recommendations:

- Fisheries, Wildlife and Water Trails staff shall individually prioritize at least 10% of the total miles of mapped river and stream GIS coverage.
- Fisheries, Wildlife and Water Trails staff shall collectively summarize overlaps between conservation plans and the mapped priorities.
- Identify priority areas and evaluate coordination potential with other internal and external river programs and interests.
- Develop a prioritized list of projects that encompasses all DNR river-related programs to enhance river restoration efforts.

Priority: Develop and Implement a River Conservation Areas Program.

The Issue:

Public demand for access to rivers and their riparian corridors, and landowner demand for programs providing assistance along unstable and/or flood prone waterways indicates that existing efforts are not sufficient. Development of designated River Conservation Areas for the purpose of protecting and improving river shorelines, improving water quality, providing access for recreation, and that become focus areas for stream improvements could maximize the progress and benefits of river restoration. The River Conservation Areas Program would enhance and expand existing programs including coldwater trout streams, wildlife management, water trails, and watershed improvement.

Iowan's have an increasing interest in their rivers for recreation. In a 2010 ISU study showing that nearly half of Iowans had visited rivers the prior year, the key factors for choosing the river were:

A) Close proximity to home.
B) Good water quality and natural settings like forest and prairie dominating.
C) Rivers abundant with game fish.
D) This developing demand can be served by a joint Fisheries, Wildlife and Water Trails priority system patterned in part after Minnesota DNR's popular Aquatic Management Areas (AMA) program. The AMA program was established to protect critical fish and wildlife habitat along river and lake shorelines from rapid development. In Iowa, the River

Conservation Areas Program would serve somewhat different needs, but the core concept of providing angling shoreline access, wading access for trout streams, and navigational shoreline access while protecting and enhancing critical riparian wildlife habitat remain important features. Over time, this approach to improving Iowa's fishing, wildlife, and navigation opportunities will improve our rivers and water quality, enhancing river experiences for Iowans close to home, while serving landowners close to priority streams.

Recommendations:

- Areas identified above for increased DNR program collaboration become priority areas for increased access and private landowner voluntary cooperation.
- Fisheries, Wildlife and Water Trails staff, in conjunction with other DNR river programs, shall collectively develop joint tiers of priorities for these areas, and new tiers of appropriate management effort will be pursued.
- Partnerships with county conservation boards will be explored for management, access, and conservation.
- Capacity will be explored to improve landowner assistance with streambank erosion, bed degradation, and flood damage problems, and these elements will be integrated into broader conservation and recreation strategies.
- Establish a River Conservation Areas Program as a focus to guide permanent protection of lands through easements and fee title public lands for the purposes of protecting and improving river shorelines, improving water quality, and providing public access for angling and other compatible outdoor recreational uses while complimenting and filling critical needs in existing programs.

Priority: Develop a Stream Mitigation Program for Iowa

The Issue:

The building or significant upgrading of roadways or other infrastructure, land development for housing or commercial purposes, and a variety of other activities may have negative impacts on Iowa's streams and rivers. Unavoidable impacts require mitigation under federal rules. DNR is working to develop a consistent, federally-approved set of tools for mitigation and a mitigation program for implementation.

River restoration aims to improve the health and ecological function of our streams. However, development activities are ongoing and may have negative impacts on our waterways. Federal rule requires unavoidable impacts to be mitigated. Mitigations must be approved by the Corps in consultation with an Interagency Review Team, consisting of federal agency representatives. There is currently no qualitative method for assessing impacts and determining adequate mitigations. In addition, there is a wide variety in the approaches to assessing stream restoration needs resulting in extended review processes, delayed project approval, and the potential for project failures. DNR is working with the Corps and other state and federal organizations, to develop an Iowa Stream Mitigation Method, adapted from methods approved for neighboring

states. DNR is also researching options for development of a stream mitigation program, such as an in-lieu fee program, which would allow those needing mitigation to pay into a fund that would then be distributed to address stream restoration priorities around the state.

Recommendations:

- Develop and obtain approval from the Corps for the Iowa Stream Mitigation Method, a tool to objectively assess the impact of development activities and determine the value of proposed mitigations.
- Assess the resources required to become a provider of mitigation projects.
- Determine a process for prioritizing mitigation projects.
- Research options for program development via a memorandum of understanding with the Iowa Department of Transportation or an approved in-lieu fee program.
- If development of a program is in the best interests of the resource, the state, and DNR, develop plans and obtain authorization.

Enhance:

Priority: Priority: Add a Stream Geomorphologist/Engineer with Hydrologic & Hydraulic Modeling Capabilities to DNR staff expertise.

The Issue:

A number of DNR river program staff have practical experience in river restoration planning and implementation. However DNR's river restoration assistance would benefit greatly from the addition of one or more formally trained geomorphologists and hydrologic modelers for assessing the effectiveness of planned structures, channel alterations, and other in-stream modifications.

Work in stream channels may involve bank stabilization, re-meandering of straightened channel segments, and/or efforts to prevent degradation or aggradation of the stream bed. Stream channel modifications alter stream velocities and therefore the ability to remove or deposit sediment, and may result in changing conditions up-or down-stream from the modified channel. While DNR and partners have staff with practical experience in channel improvements, adding a stream geomorphologist -hydrologic modeler, available for either DNR-led or external partner restoration efforts, would be a significant addition to river restoration activities.

Recommendations:

- DNR determine if funds can be found internally to fill a position with geomorphology-hydrologic modeling skills

- Develop a funding plan for permanent positions dedicated to river restoration.

Priority: Assure Coordination with Flood Plain Program during Project Planning

The Issue:

Some river restoration activities may need approval or guidance from DNR's Flood Plain program, which is tasked with enforcement of the Iowa Administrative Code regarding construction in river channels and flood plains. The permitting process requirements are not always well understood during river project planning and design. Without early coordination, conflicts may arise at the end of the design process when project changes may result in increased cost and delays.

Efficiently conducting river restoration activities in stream channels or riparian zones will require improved understanding of flood plain regulations by conservationists, and of restoration tools and approaches by flood plain staff. There is need for increased communication between the parties, which often share the goal of reducing flood impacts. A partnership should be formed early in the design process to identify any potential conflicts that may cause delays or design changes. As river restoration efforts increase in number and scope, DNR and partners need to evaluate current floodplain rules to see if changes are needed to accommodate best practices.

Recommendations:

- Encourage early consultation meetings between permitting staff and project designers/planners.
- Continue to develop and improve existing permitting checklists that help convey permitting requirements for various restoration and improvement project types.
- Work to identify existing rules that may not be consistent with current environmental best practices for river restoration for possible future rule updates.

Priority: Develop a Best-Practices Toolbox for River Restoration

The Issue:

River Restoration may involve a wide range of practices, depending on the restoration needs, the physical setting of the river reach being restored, and the options and budget available for the work. There is a need for a consistent set of best practices for use by the many entities that are interested in undertaking restoration. The toolbox should be a guide for how to proceed, and what works best in different settings and situations.

River Restoration activities may include a variety of methods, depending upon a project's restoration goals. It may include stream stabilization, dam removal or modification, stream

habitat, riparian zone management, floodplain connectivity, and the stream-watershed interface. It will often include aspects of monitoring and data sharing as well. There is a need for a consistent best-practices approach for all restoration efforts to use for assessment, evaluation, design, construction, monitoring, and funding of projects.

Recommendations:

- DNR and partners will create a best practices toolbox using a holistic and consistent approach for improvements within rivers and streams throughout the riparian corridor and into the watershed.
- Develop the toolbox to provide not only examples of restoration methods but details a best practice process for a project from assessment through monitoring, regardless of size or cost.

Connect:

Priority: Coordination of Education, Interpretation and Communication

The Issue:

DNR, other agencies, and NGO's deliver educational and interpretive programming on river ecology, restoration and recreation. Many of the delivered programs are independent of others and may be duplicative and more than likely not consistent in messaging. There is a need to coordinate these efforts. Strategic communication, whether through formal education or interpretation, aimed at achieving a long-term goal, requires sustained and consistent messaging. This can be targeted to a variety of groups through different tools (programming, hands-on learning, formal education, internet, social media) but not diluted. These uniting efforts can lead to bigger gains than independently trying to reach audiences to affect change.

Education, interpretation and communication efforts will be primarily focused on river restoration. The relationships between river recreation and flooding will be targeted for improved collaboration at a later date. The goal of combined and enhanced efforts in education, interpretation and communication is to work with Iowans to more clearly convey the value and benefits of river restoration, ecologically, biologically, and monetarily. The efforts will lead to an understanding of how biological functions tie into restoration efforts, why rivers and the paths they cut are dynamic, and what are the opportunities and limitations for river restoration in Iowa.,

Recommendations:

- DNR and partners will inventory governmental and NGO'S that have education, interpretation or communications efforts in place that link to river restoration, to include:
    - Identifying programs – topics
    - Target audiences
    - Location of efforts (park, river specific, county or statewide)
    - Partnering efforts
    - Resources and written media used
    - Visual media
    - Social media efforts
    - Events conducted or planned
    - Volunteer opportunities
    - Financial Assistance provided
    - Success stories on current projects
- Create messaging that is consistent for all to use in education, interpretation and communication of river restoration.
- Developing and communicating success stories: what can the everyday person do, as a means to create opportunities for people to get involved in their backyard.

Priority: Connecting DNR River Programs to Restoration Efforts

The Issue:

Greater gains in river restoration will require not only aligning DNR's various river-related programs, but also establishing a point-of-contact for interested parties to connect to those programs. Currently there aren't staff, broadly knowledgeable in river restoration and familiar with DNR and partner programs, available to serve in this role. As DNR develops a Stream Mitigation program, staff dedicated to restoration efforts becomes increasingly critical.

There are many aspects of river restoration, a variety of possible funding sources, and a wide range of assistance and information that DNR and partners can provide. In particular the establishment of a Stream Mitigation program provides both excellent opportunities for stream improvements and more challenges for interested parties. Mitigation and river restoration efforts will be enhanced and accelerated by establishing a knowledgeable point-of-contact to guide interested parties to the technical and financial assistance needed for restoration success. This

staff person will help connect those interested in restoring our streams to the array of existing monitoring data, assist in assuring all permitting needs are met, and help interested parties to utilize the restoration "toolbox". This person will also be key in creating a Stream Mitigation program for Iowa.

Recommendations:

- Create and staff a stream mitigation – river restoration coordinator position.
- Develop the resources for permanent funding of the position.
- Assess mitigation and restoration program needs into the future, allowing for consideration of additional staffing and support.

River Restoration in Iowa: First Steps

The state of our river corridors is fundamental to the health and happiness of Iowans. With limited resources available, we must take advantage of opportunities to pool our efforts to achieve successful stream improvements that can be appreciated by Iowans for generations to come. River restoration is a multi-dimensional process that yields an array of benefits, including improved water quality, more productive fish and wildlife habitat, enhanced recreational opportunities, and support for local economies. DNR aims to work with partner agencies, local communities, and NGOs to achieve restoration goals. This strategy outlines the priorities DNR will address to better evaluate and protect our rivers, enhance the function and health of our streams, and better connect people and their waters.

Websites for Selected DNR River Programs

River Restoration:

http://www.iowadnr.gov/test/Environmental-Protection/Water-Quality/River-Restoration

Watershed Improvement Section:

http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement

Low-head Dam Mitigation:

http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Low-Head-Dams/Dam-Mitigation-Safety

Water Trails:

http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Water-Trails

Protected Water Areas:

http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Stream-Care/Protected-Water-Areas

River / Paddling Safety Education:

http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Paddler-Resources/Instruction-Safety

Wildlife:

http://www.iowadnr.gov/Conservation/Iowas-Wildlife

Stream and Watershed Integrated Management (SWIM) workshop:

http://www.iowadnr.gov/Conservation/For-Professionals/Stream-Watershed-Mgmt

Environmental Review:

http://www.iowadnr.gov/Conservation/Threatened-Endangered/Environmental-Reviews

Sovereign Lands:

http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Sovereign-Lands-Permits

Use Assessment and Attainability Analysis:

http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Quality-Standards/Designated-Uses/Use-Assessments

Integrated Water Quality Report and the Impaired Waters List:

http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Impaired-Waters

Water Quality Monitoring:

http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring

River of Words (ROW) Environmental Art and Poetry Competition:

http://www.stmarys-ca.edu/center-for-environmental-literacy/river-of-words

Flood Plain Permitting:

http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Flood-Plain-Management/Flood-Plain-Dev-Permits

Dam Modification and Inspection:

http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Dam-Safety

Project Aware:

http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Project-AWARE

List of Acronyms

AMA	Aquatic Management Areas
AWARE	A Watershed Awareness River Expedition
CCB	County Conservation Board
CKAN	Comprehensive Knowledge Archive Network
Corps	U.S. Army Corps of Engineers
DNR	Department of Natural Resources
EPA	U.S. Environmental Protection Agency
GIS	Geographical Information System
IDALS	Iowa Department of Agriculture and Land Stewardship
IDALS-DSCWQ	Iowa Department of Agriculture and Land Stewardship - Division of Soil Conservation and Water Quality
INHF	Iowa Natural Heritage Foundation
NGO's	Non-Governmental Organization
NRCS	Natural Resources Conservation Service
PWAs	Protected Water Areas
REAP	Resource Enhancement and Protection
ROW	River of Words
SWCDs	Soil and Water Conservation Districts
SWIM	Stream and Watershed Integrated Management
TMDL	Total Maximum Daily Loads
UAA	Use Attainability Assessment
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VSM	Value Stream Mapping
WIS	Watershed Improvement Section
WMPs	Watershed Management Plans